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(12) AUSTRALIAN PATENT ABSTRACT

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(54) YARN

(71) S.A. DES FILES LASTEX

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(74) HL

(57) Claim

1. Thermo-adhesive elastic yarn designed to be added on a soft backing by application, and of the type comprising an elongated elastic element associated to at least a second elongated element with which it forms an elastically stretchable combination, wherein said yarn comprises at least another independent element adapted to be at least partly moved relatively to the first elongated element, said second element being at least locally coated with a thermo-adhesive substance.

Thermo-adhesive elastic yarn.

The present invention relates to elastic yarns designed to be added to soft backings with a view to obtaining a gather, in parts at least, thereof.

The technical field concerned is, more particularly but not exclusively, that of clothing in general, i.e. including all the elements which can be deemed to contribute to the protection, the adornment, the dressing and the ornamenting of all or part of the human body, whether or not these elements are visible.

In the aforesaid technical field, it is known to produce items of clothing which have, either in parts, or along edges, elastically deformable gathered areas by which they are adequately held on the body with no interference to the wearer.

Up to now, it has been known to produce sorts of hems wherein elastic yarns are introduced and immobilized by tension stitching, so that when the tension is released the result is a gathering. Another known method consists also in weaving, locally at least, a stretched elastic yarn with the yarns constituting the item of clothing, so as to produce, after slackening, a gathering which is perpendicular to the line of elastic yarn.

The aforesaid methods present certain advantages but they are not practical to use when the element constituting the item of clothing is a sheet or strip of woven or non-woven synthetic material. Such methods are not suitable either for the mass-production of articles as they do not allow fast rates of production.

In the above cases, it has been proposed to replace the known solutions by fitting an elastic band constituted by a flat yarn added on by adhesive means to the support designed to receive it.

The manufacturing technique which is known in this field consists in arranging for a stretched flat yarn to unwind, said yarn containing adhesive spots. In a subsequent operation, the yarn is laid on the support

and held in contact thereon by the application of a pressure and a temperature designed to polymerize the adhesive.

5 Such a manufacturing technique is not suitable for mass-production as it is necessary to provide a relatively complex installation for the unwinding and stretching of the flat elastic yarn, and for depositing the adhesive spots by means of small sized nozzles, in order to prevent the glue from forming threads or from running.

10 Besides the high cost of these installations, their complexity also necessitates a difficult maintenance which can often perturb the lines in a mass-production of articles for wide distribution.

15 It is the object of the present invention to solve the aforesaid problem by proposing a new elastic yarn having the particular feature of being provided with the means to join it to a support of some sort, so that the two elements can be joined together easily at a fast running speed, in mass-production lines , without  
20 necessitating the use of an important additional equipment which is expensive and of delicate and complex maintenance.

One object of the invention is to provide an elastic yarn permitting to save considerably on the adhesive used and to increase the rates of production.

25 Another object of the invention is to provide an elastic yarn which is produced at a lower cost than the currently used elastic strips.

These objects are reached according to the invention, with a thermo-adhesive elastic yarn which  
30 comprises an elongated elastic element which is associated to at least one other elongated element with which it forms an elastically stretchable combination, the said second element being coated in parts at least with a thermo-adhesive substance.

35 The invention will be more readily understood on

reading the following description with reference to the accompanying drawings, in which :

- Figure 1 is a partial view of an elastic yarn according to the invention, being stretched.

5        - Figure 2 is a similar view to Figure 1 showing a variant of embodiment.

- Figures 3 and 4 are partial elevational views showing two other possible embodiments of the invention.

10        Figure 1 shows that, according to the first illustrated example, the yarn according to the invention comprises an elastic core 1 in any suitable material, which can be of circular cross-section, preferably, or in some cases, of square or rectangular cross-section, then constituting a sort of elastically deformable  
15        ribbon.

The core 1 is associated to a wrapping yarn 2 which is wound into successive spires, which spires can be jointed when the core 1 is not stretched. Said wrapping yarn 2 may be a mono-strand or multi-strand, natural,  
20        artificial or synthetic fiber.

The wrapping yarn 2, hereinafter termed external, is associated to a thermo-adhesive substance, deposited, locally at least, on the spires 3. Preferably, said thermo-adhesive substance is composed of a resin, such  
25        as for example, that commercialized under the trademark "ELVAX 4310" which can be defined as being an ethylene/vinyl acetate/organic acids terpolymer. The thermo-adhesive substance can be deposited in several suitable ways on the spires 3, or it can also be coated over the  
30        entire surface of the external wrapping yarn.

It is also possible in certain cases to deposit the thermo-adhesive substance on the spires 3, after these have been wound on the core 1.

35        The elastic yarn covered as explained hereinabove, can be stretched before being applied on a support. As

illustrated in Figure 1, the different spires, as a result, are relatively set apart, constituting then joining points with the support by way of the thermo-adhesive substance which they are coated with. The application and joint at the interface level can then be ensured in practical manner by causing the support and the stretched covered yarn between the elements of a pressurized applicator, in which the temperature is raised in order to soften the thermo-adhesive substance sufficiently to make pinpoint joints between the yarn and the support.

By way of example, when applying the elastic yarn on a synthetic support such as in vinyl polychloride, the working parameters to ensure a joint between the yarn according to the invention coated with the product sold under the trademark "ELVAX 4310" and the support, are as follows :

- pressure ..... about 1 kg
- temperature ..... between 50 and 110°C
- duration ..... less than or substantially equal to 1 sec.

When applying the yarn on a cotton support, the working parameters applied are as follows :

- pressure ..... about 1 kg
- temperature ..... between 50 and 150°C
- duration ..... between 1 and 5 secs.

The tensile stress applied to the core 1 is of course dependent of the characteristics of the constitutive material used and of the desired gathering.

The covered yarn according to the invention is inexpensive to produce and its application on a support requires no particularly complex or delicate installation for depositing the spots of adhesive. As a result, the costs of production and maintenance of the machines required to apply such a yarn on any type of support,

is considerably reduced. It also becomes possible to set up continuous production lines of articles or clothing which can be mass-produced at lower costs.

Another advantage of the object of the invention resides in that, as shown from experience, a saving is made on the amount of adhesive used, since according to the invention, the adhesive substance is more widely distributed and it is not necessary to deposit large blobs of it as in the techniques used up to now.

The object of the invention can be used in many fields, and more particularly in the clothing field. In that field, can be noted the production of babies' nappies, protective masks, caps, dust-covers, under-clothes and overalls.

Another field of application is that of household linen and in particular fitted sheets.

Figure 2 shows a variant of embodiment wherein the yarn according to the invention is constituted from the core 1 on which a wrapping yarn 4, termed "internal", is wound in spires 5 which are jointed when the core 1 is not stretched. Preferably, the external wrapping yarn 2 described hereinabove, is then wound of the assembly constituted by the core 1 and the internal wrapping yarn 4, in a winding direction which is reverse to that of the yarn 4, so as to obtain two superimposed winding layers.

Such a structure gives a well-balanced finished yarn and eliminates the risks of the core 1 kinking when this is only associated to one wrapping yarn.

In certain cases, it may be recommended to use an internal wrapping yarn 4, which has the same characteristics as the external wrapping yarn 2, where the texture, the nature of the constitutive material and the title are concerned.

In certain cases also, the internal wrapping yarn 4

can be associated to a thermo-adhesive substance deposited as indicated hereinabove, either at the level of the spires 5 prior to the winding of the external wrapping yarn 2, or else by prior coating of the yarn 4. In such a case, the relative pressurizing at a given temperature and for a predetermined period between the yarn according to the invention and a support of some sort, enables to multiply the contact points between the latter and also to join the spires 3 and 5 together at their intersecting or joining level.

Figure 3 shows a variant of embodiment wherein the yarn according to the invention comprises one elastic strand la, shown in the drawing as being of circular cross-section. It must be understood that any other cross-section is also suitable. The strand la, which plays the part of the core 1 in the foregoing examples, is associated to a second strand 6 which can have the same composition as the wrapping yarns 2 and 4 and be likewise priorly coated with the thermo-adhesive substance.

The strand 6 and the strand la are combined by twisting and throwing when the elastic strand la is stretched. The resulting combination is constituted, when the strand la is slackened off, by a succession of jointed spires 7 and 8 which successively belong to the elastic strand la and to the strand 6.

The aforesaid yarn is used as previously indicated by stretching the combination so as to separate the different successive spires 7 and 8. The combination thus stretched is then placed on a support as previously indicated, pressure and heat being applied for a specific period of time. This softens up the thermo-adhesive substance, at least where the spires 8 are in contact with the support. The result is an assembly by successive points of adhesion, which points are all the more apart

from one another that the stretching force initially applied is great.

Figure 4 illustrates another embodiment of the elastic yarn according to the invention wherein said yarn comprises an elastic strand 1b which can be compared to the core 1. Said strand 1b is stretched and and combined with a strand 9 which is knitted to form successive stitches which are pulled when the yarn is stretched as shown in the drawing. The strand 9 can be a single-filament or a multi-filament, as afore-described, and is coated, at least locally, with the thermo-adhesive substance preferably before being knitted around the elastic strand 1b.

The resulting pulled state of the combination is chosen to show that in the yarn obtained, there is for each stitch, laterally to the strand 1b, on the one hand one loop and on the other hand two, and that the lateral distribution of these loops is reversed from one stitch to the next. The different loops thus represent, after the aforesaid application, joining points between the support and the combination via the thermo-adhesive substance.

In the foregoing, it is indicated that the yarn is pulled and then applied to a support. This joining method it is true, can be used over the entire length of a segment of yarn which is to be entirely applied on a support, or over only part of the length of such a segment which is also required to form a joining element, such as a bar, a loop, etc...

The invention is in no way limited to the description given hereinabove and on the contrary covers any modifications which can be made thereto without departing from the scope thereof.



## THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. Thermo-adhesive elastic yarn designed to be added on a soft backing by application, and of the type comprising an elongated elastic element associated to at least a second elongated element with which it forms an elastically stretchable combination, wherein said yarn comprises at least another independent element adapted to be at least partly moved relatively to the first elongated element, said second element being at least locally coated with a thermo-adhesive substance.
2. Elastic yarn as claimed in claim 1, wherein the said element coated with the thermo-adhesive substance is mono-strand.
3. Elastic yarn as claimed in claim 1, wherein the said element coated with the thermo-adhesive substance is multi-strand.
4. Elastic yarn as claimed in claim 1, 2 or 3, wherein said yarn comprises an elastic core and an external wrapping yarn wound into spires and coated at least locally with a thermo-adhesive substance.
5. Elastic yarn as claimed in claim 4, wherein said yarn comprises an elastic core, a wrapping yarn known as internal, wound into spires on the core and a wrapping yarn known as external, wound into spires over the first wrapping yarn in a winding direction which is reverse to that of said first wrapping yarn, the said external yarn being coated at least locally with a thermo-adhesive substance.
6. Elastic yarn as claimed in claim 5, wherein the internal wrapping yarn is coated at least locally with a thermo-adhesive substance.
7. Elastic yarn as claimed in claim 1, wherein said yarn comprises an elastic element and a strand coated with the thermo-adhesive substance, both the elastic element and strand being relatively twisted.

9. Elastic yarn as claimed in claim 1, wherein said yarn is stretched and thermo-adhesively applied on a soft backing to form gatherings thereon once the tension is released.

5 10. Elastic yarn as claimed in claim 9, used in the field of clothing.

11. Elastic yarn as claimed in claim 9, used in the field of household linen.

Dated this 21st day of October, 1981

S.A. DES FILES LASTEX  
by their Patent Attorneys,  
HALLIDAYS.

Fig. 1

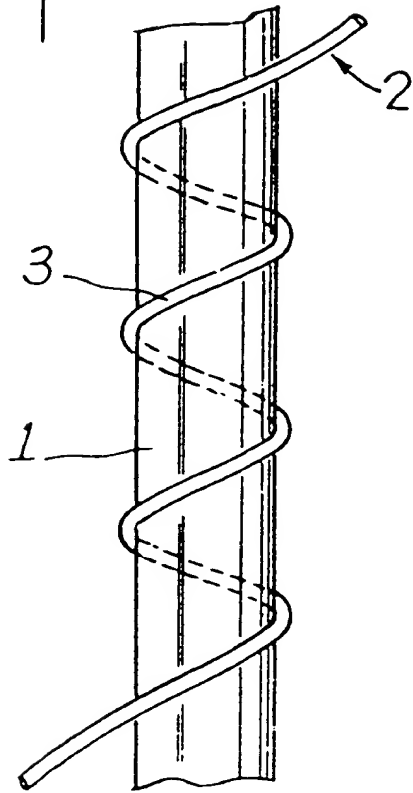


Fig. 2

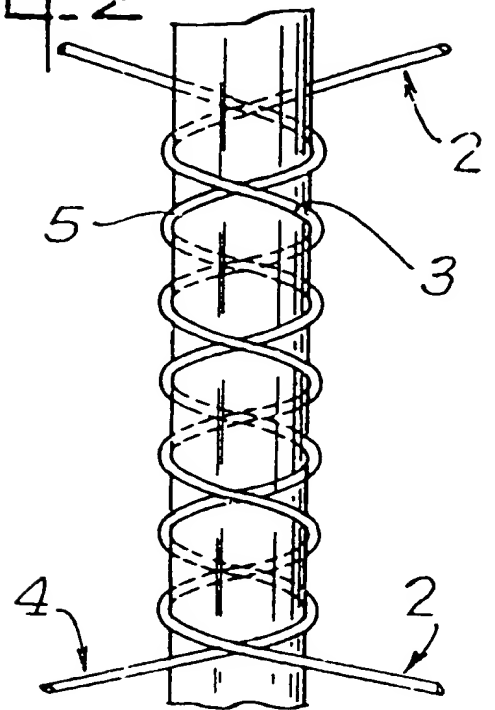


Fig. 3

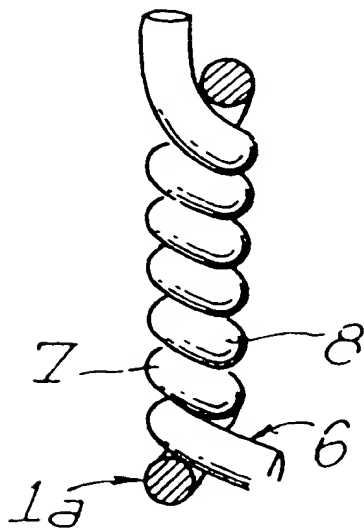


Fig. 4

